

Urosurvey as a Public Health Tool to Identify Locally-Acquired Cases of Zika Virus: Experiences of the Bureau of Public Health Laboratories-Miami

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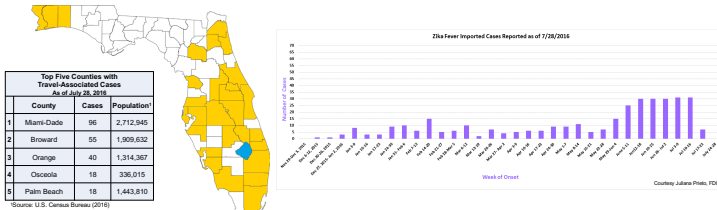


Abstract

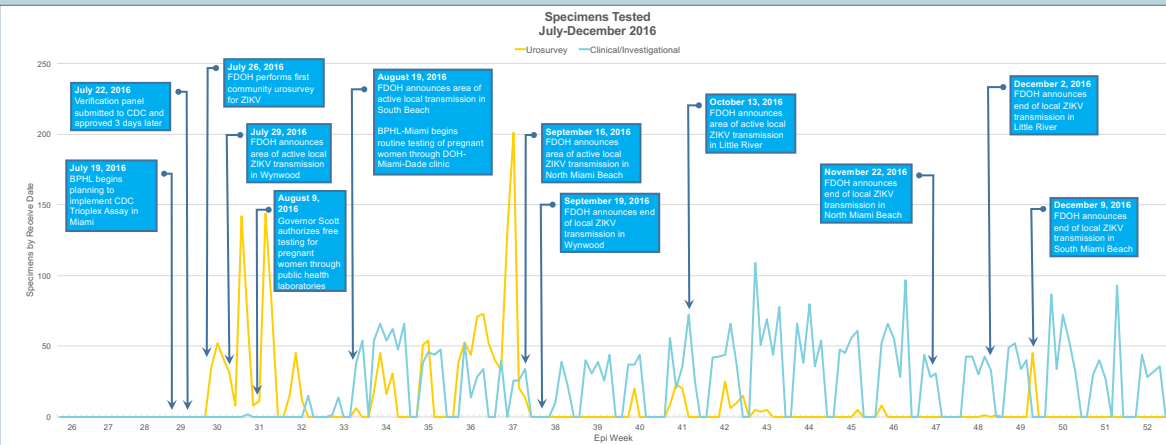
On August 1, 2016, the Centers for Disease Control and Prevention (CDC) issued a health advisory notice in response to a newly identified area of vector borne transmission of Zika virus in Miami-Dade County. Much of the evidence garnered to support this public health action was provided through a joint effort of the laboratorians and epidemiologists of the Florida Department of Health (FDOH) following a survey of the community immediately surrounding the separate workplaces where two otherwise unrelated cases of Zika virus infection were identified. Initially, urine specimens were collected from the households within a 150-meter radius and later expanded to determine the extent of spread of the virus. Results from this urosurvey provided additional information and context for the initial outbreak of ZIKV in Miami-Dade County.

In addition to identifying additional cases for follow-up, the data gained from the urosurvey aided in establishing the tentative boundaries for the ensuing epidemiological investigation. Urosurveys have since been used in Florida to investigate sporadic cases of Zika virus infection and to determine the extent of the potential area of transmission. The urosurvey has proven to be an effective tool to identify both symptomatic and asymptomatic cases and guide further public health actions. Here, we present the experiences of the Bureau of Public Health Laboratories-Miami with providing high-volume testing support for the epidemiological investigations of locally-acquired Zika virus infection.

Background



29 of 67 counties had identified at least one case of Zika virus disease as of July 28, 2016. Within those 29 counties, 350 cases had been reported, 55 of which involved pregnant women. All cases investigated were determined to have been acquired abroad. On July 29, 2016, the Florida DOH announced that an investigation of a cluster of 4 cases indicated the disease was acquired locally.



Field Collection



Collection of urine specimens was coordinated by DOH-Miami-Dade and supported by the Bureau of Epidemiology. Deployed staff from other FDOH organizations, members of the county's Medical Reserve Corps, volunteers, and interns assisted with the collection of specimens. Samples were typically collected door-to-door or from a fixed location in the community. Forms were optimized to ensure accurate data collection and facilitate accessioning in the laboratory. A dedicated refrigerator was setup in the laboratory specifically for urosurvey specimen drop-off and to keep ice packs frozen for the following day.

Laboratory Testing



Urosurvey specimens were typically accessioned and processed by two laboratorians. During the outbreak, support was provided through other agencies within the FDOH; these staff members assisted with the accessioning process and other non-technical work such as reporting results. Specimens were lysed prior to extraction using either the Roche Magna Pure LC 2.0 instrument or Magna Pure 96 System. PCR setup and template addition was expedited using multichannel pipets and plate templates optimized to match extraction output plates.

Results

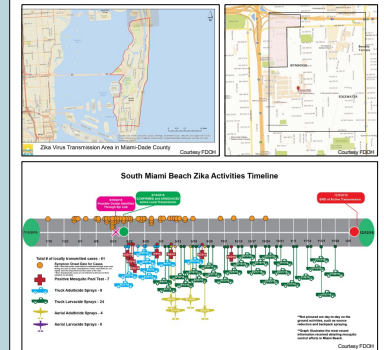
Specimen ID	Urosurvey	Clinical	Investigational	Total
1	1	1	1	3
2	1	1	1	3
3	1	1	1	3
4	1	1	1	3
5	1	1	1	3
6	1	1	1	3
7	1	1	1	3
8	1	1	1	3
9	1	1	1	3
10	1	1	1	3
11	1	1	1	3
12	1	1	1	3
13	1	1	1	3
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43	1	1	1	3
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45	1	1	1	3
46	1	1	1	3
47	1	1	1	3
48	1	1	1	3
49	1	1	1	3
50	1	1	1	3
51	1	1	1	3
52	1	1	1	3

Excel spreadsheets were used to expedite the reporting of results to epidemiologists and to facilitate near real-time responses. Laboratorians regularly worked late into the evening as the results often impacted the following day's activities, such as determining further locations to collect.

Purpose	Detected	Not Detected	Inconclusive	Rejected	Total
Urosurvey	29	1851	1	4	1885
Investigation	39	350	0	0	389
Clinical	1	3380	0	0	3381
Total	69	5581	1	4	5655

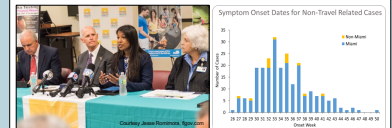
In addition to testing urosurvey specimens, the laboratory began routine testing of pregnant women in the county and continued supporting epidemiological investigations.

Public Health Actions



Both symptomatic and asymptomatic cases were identified through community urosurveys. Information from these urosurveys, along with other surveillance activities, guided public health actions such as:

- Identify clusters
- Informing mosquito control activities
- Identifying areas and timelines of active transmission
- Advising at-risk populations of the risks associated with travel to certain areas
- Performing environmental assessments for mosquito activity



The information gained through community urosurveys- both positive results as well as negative- helped provide situational awareness to decision makers, the media, and the community. Due, in part to these urosurveys, local transmission was declared over on December 9, 2016.

Discussion

Conducting urosurveys presents many challenges beyond the normal collection and testing of specimens. The undertaking requires a large degree of coordination between both the laboratorians and epidemiologists to ensure the timely submission and testing of specimens.

From the perspective of the field epidemiologist, organizing and managing a urosurvey can be logistically challenging. A primary concern includes determining the appropriate collection strategy. Door-to-door sampling may offer a more comprehensive and systematic approach but requires a larger staff to be effectively conducted. Field sampling offers the advantage of requiring fewer personnel but relies on the community to be available and actively provide specimens.

From the perspective of the laboratory, the primary challenge lies in the ability to be able to handle a large influx of specimens at any given point. Supervisors must ensure the testing workflow is capable of this while maintaining routine testing services. Instrumentation and staffing plays a critical role in determining the ability of the laboratory to maintain this increased degree of readiness.

The success of these urosurveys was a result of a collaborative effort between laboratorians and epidemiologists alike. Execution of urosurveys was pivotal to the public health actions taken and, ultimately, the control of the ZIKV in Miami-Dade County.